

Work Order ID 79019

January-18-12 1:54:11 PM

79019

Page 1

Item ID: D407-667-205

Accept

N900040100

Setup

Start

NS1

Revision ID:

Item Name: Crosstube Aft

Stop

NS2

Start Date: 18/01/2012 Start Qty: 1.00

1

Cust Item ID:

Required Date: 08/02/2012 Req'd Qty: 1.00

1

Customer:

Reference:

Approvals: Process Plan: M.L.J

Date: 12/01/13

Tooling:

Date:

Run

Start

NR1

QC:

Date:

SPC (Y/N):

Date:

Stop

NR2

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
--------------------------------	--------------------------	----------------------	---------	--------	--------------	---------------	---------------	------------------	----------------

Draw Nbr	Revision Nbr								
D407-667-245	Rev F/DEO								
100		SL	0.00						
100	DOCUMENT CONTROL								
DC	Memo	0.00	CHG005	82/03/14					
Document Control	Photocopy bluefile and create labels as per PPP D407-667-205 CHG007								

110	Pick Kit	0.00	JW	12-2-29
110	Packaging			
Packaging	Memo	0.00		
Packaging				

120	BENDING MACHINE - CROSSTUBES	0.00	JW	12-2-29
120	Memo	0.00		
CNC Bend 1	1-Bend tube as per Dwg.D407-667-245 using CNC bender program 407 Aft and Folio 21		KM	
CNC Delta 100 Bender				

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

Resolution: _____ Disposition: _____ QA: N/C Closed: _____ Date: _____

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

NOTE: Date & initial all entries

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QC:

Date:

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Date:

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NR2

Sequence ID/
Work Center ID

Operation
Description

Set Up/
Run Hours

Tool ID

Tool #

Plan
Code

Accept
Qty

Reject
Qty

Reject
Number

Insp.
Stamp

130

QC15- Crosstube Dimensional Check

0.00

52/02/29

130

QC

Quality Control

Memo

W/O:		WORK ORDER CHANGES					
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Process Plan:

Date:

Tooling:

Date:

Run

Start

NR1

QC:

Date:

SPC (Y/N):

Date:

Stop

NR2

Sequence ID/
Work Center ID

Operation
Description

Set Up/
Run Hours

Tool ID

Tool #

Plan
Code

Accept
Qty

Reject
Qty

Reject
Number

Insp.
Stamp

140

140

Crosstubes

Crosstubes

0.00

Memo

0.00

1-Drill pilot holes in tube using drill Jig DT8583 & DT8584 as per Dwg D407-667-245. Drill all (3) top holes.

2-Drill and Ream all holes in tube to finish size using drill Jig DT8583 & DT8584 as per Dwg D407-667-245Check dimensions between holes on all four sides.

3-Flip tube and switch drilling Jigs from right to left, left to right. Locate Jigs off existing holes using "T" pins.

4-Drill pilot holes using drill Jig DT8583 & DT8584 as per Dwg D407-667-245. Drill only the top (2) holes.

5-Drill & ream the top (2) holes to finish size using drill Jig DT8583 & DT8584 as per Dwg D407-667-245

6-Drill Aft rivet holes using drill Jig DT8789 as per Dwg D407-667-245. Note: Aft side has 3x top holes.

7-Drill Fwd rivet holes using drill Jig DT8789 as per Dwg D407-667-245. Drill only the top (3) holes.

8-C'sink holes as per Dwg D407-667-245. Allow rivet to sit below surface to compensate for paint.

9-Scribe tube to identify on the inner chamfer in the cuff D# and B#

10-Deburr & Inspect for surface damage. Repair damage within limits as per

MO/RM

12/2/29

MO

12/2/29

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	QC:	Date:	SPC (Y/N):	Date:		Stop	*NR2*

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
--------------------------------	--------------------------	----------------------	---------	--------	--------------	---------------	---------------	------------------	----------------

Dwg D407-667-245

150

150

HandFXtube

Hand Finishing Crosstubes

Crosstubes Chemical Conversion

0.00

MO

12/2/29

Memo

0.00

160

160

QC

Quality Control

QC3- Inspect Part Finish

qc

Memo

0.00

5/26/10

0.00

170

170

QC

Quality Control

QC5- Inspect part completeness to step on W/O

Memo

0.00

5/26/10

0.00

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

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Customer:

Reference:

Approvals:	Process Plan:	Date:	Tooling:	Date:	Run	Start	*NR1*
	QC:	Date:	SPC (Y/N):	Date:	Stop		*NR2*

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
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180	Outsource process - NDT per QSI038 4.1	0.00							
180									
Outsource2	Memo	0.00							
Outsource process - NDT	Liquid Penetrant Inspection as per QSI 038O Issue P/O: <u>16341</u> LPI as per ASTM 1417 Level 2 Attach copy of NDT results to work order								

190	Packaging	0.00							
190									
Packaging	Memo	0.00							
Packaging	Ensure copy of NDT results attached to work order.								

200	QC5- Inspect part completeness to step on W/O	0.00							
200									
QC	Memo	0.00							
Quality Control									

1/2-02-2

Pho →

1/2/3/0

Pho →

5/2/03/05

W/O:		75015	WORK ORDER CHANGES				
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: 5407-0667-205 PAR #: _____ Fault Category: Landing gear/cross tube NCR: Yes No DQA: Not Date: 12/03/14
121258 Resolution: No work Disposition: Rework QA: N/C Closed: 1405 Date: 12/03/14

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			
12/03/05 <u>#160</u>		tube has indentations found out not inspect P.C. Proofs.	<u>CP</u> 12-03-05 <u>QSI42</u>	- Re grind out marks. - Re modify as per 05/2005 - Re NOT.	JW 12-32	<u>SPLA16</u>	<u>CP</u> 12-03-05 <u>QSI42</u>	S 12/03/05

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Cust Item ID:

Required Date: 08/02/2012 Req'd Qty: 1.00 *1*

Customer:

Reference:

Approvals:	Process Plan:	Date:	Tooling:	Date:	Run	Start	*NR1*
	QC:	Date:	SPC (Y/N):	Date:		Stop	*NR2*

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
--------------------------------	--------------------------	----------------------	---------	--------	--------------	---------------	---------------	------------------	----------------

210		0.00							
-----	--	------	--	--	--	--	--	--	--

210	SprayPaint								
-------	------------	--	--	--	--	--	--	--	--

SprayPaint	Memo	0.00							
------------	------	------	--	--	--	--	--	--	--

Spray Painting	***Mask underside of crosstube as shown***								
----------------	--	--	--	--	--	--	--	--	--

1-Prime inside and outside crosstube as per DEO D407-667-245 and QSI 005 4.2

2-Paint outside crosstube with White Imron as per QSI 005 4.2

PRIME:

Start Time: 7:20 Ad 12-3-6
Finish Time: 8:20

PAINT:

Start Time: 8:00 AB 12-3-7
Finish Time: 9:00

220	QC14- Inspect Spray Paint	0.00							
-----	---------------------------	------	--	--	--	--	--	--	--

220									
-------	--	--	--	--	--	--	--	--	--

QC	Memo	0.00							
----	------	------	--	--	--	--	--	--	--

Quality Control	Then, Wrap in plastic bag to protect from scratches								
-----------------	---	--	--	--	--	--	--	--	--

571318

(X)

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____
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NS1

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NS2

Start Date: 18/01/2012 **Start Qty:** 1.00

1

Cust Item ID:

Required Date: 08/02/2012 **Req'd Qty:** 1.00

1

Customer:

Reference:

Approvals: Process Plan:

Date:

Tooling:

Date:

Run

Start

NR1

QC:

Date:

SPC (Y/N):

Date:

Stop

NR2

**Sequence ID/
Work Center ID**

**Operation
Description**

Set Up/
Run Hours

Tool ID

Tool #

Plan
Code

Accept
Qty

Reject
Qty

Reject
Number

Insp.
Stamp

230

230

Crosstubes

Crosstubes

0.00

0.00

A8

12 - 3 - 12

Crosstubes

Memo

1- Install chafing shield as per DEO D407-667-245. Top holes should be facing up.

A/R Proseal 890 Batch: 120867
EXP: 11/12

2- Lightly scuff the bonded area using a 320 grit sand paper and clean the area with 41058 wash 'n' wipe

3-Install support with Scotch-Weld DP460 and install clamps as per DEO Dwg D407-667-245 using installation jig DT9025. Torque clamps as per dwg

A/R Scotch-Weld DP460 Batch: 119341
EXP: 21 Oct 2012

4-Install nut plates as per Dwg D407-667-245. Touch-up rivet heads with Imron paint.

240

QC5- Inspect part completeness to step on W/O

0.00

8/16/14

240

QC

Quality Control

Memo

0.00

W/O:		WORK ORDER CHANGES					
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Item Name: Crosstube Aft

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NS2

Start Date: 18/01/2012 Start Qty: 1.00

1

Cust Item ID:

Required Date: 08/02/2012 Req'd Qty: 1.00

1

Customer:

Reference:

Approvals: Process Plan:

Date:

Tooling:

Date:

Run

Start

NR1

QC:

Date:

SPC (Y/N):

Date:

Stop

NR2

Sequence ID/
Work Center ID

Operation
Description

Set Up/
Run Hours

Tool ID

Tool #

Plan
Code

Accept
Qty

Reject
Qty

Reject
Number

Insp.
Stamp

250

250

Packaging

Packaging

Pick Kit

0.00

1/17/14 C J

Memo

0.00

260

260

QC

Quality Control

QC4- 100% Inspect kits for completeness

0.00

1/17/14

10

Memo

0.00

270

270

Packaging

Packaging

Packaging

0.00

1/18/12-0314

Memo

0.00

Identify and in kanban rack

Location: _____

Rev G

W/O:		WORK ORDER CHANGES				
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

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Cust Item ID:

Required Date: 08/02/2012 **Req'd Qty:** 1.00 ***1***

Customer:

Reference:

Approvals: Process Plan:

Date:

Tooling:

Date:

Run

Start

NR1

QC:

Date:

SPC (Y/N):

Date:

Stop

NR2

**Sequence ID/
Work Center ID**

**Operation
Description**

**Set Up/
Run Hours**

Tool ID

Tool #

**Plan
Code**

**Accept
Qty**

**Reject
Qty**

**Reject
Number**

**Insp.
Stamp**

280

QC21- Final Inspection - Work Order Release

0.00

280

QC

Quality Control

Memo

0.00

MC 12/03/14

*MF
12-03-14*

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

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Picklist Print

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Page 1

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79019
D407-667-205

Parent Item: D407-667-205

Parent Item Name: Crosstube Aft

Start Date: 18/01/2012

Required Date: 08/02/2012

Start Qty: 1.00

Required Qty: 1.00

Comments:
IPP Rev:C 05.09.02 Add holes for compatibility with Bell SkidtubesKJ/JLM
IPP Rev:D Added Magnobond,Rubber Cushion & Clamps 07-02-19
JLM

****CHANGE TO CHG 005 - IF USING D2894-1 B35578 OR GREATER****
IPP Rev:E 08-05-22 add comment in seq. 6 and QC15 and QC5 DD verified
by:EC
IPP Rev:F 08-06-12 add comment in seq. 24 DD verified by:EC
IPP Rev:G 08-08-19 revE as per dwg DD verified by:EC
IPP Rev H 09.01.06 ECN 08-562 EC verified by:DD IPP Rev:I
10.04.07 revise route seq. in bom DD verified by:JLM IPP Rev J 11.04.26
removed abrasion strip ecn 11-551 EC verified
by:DD
IPP REV:K
11.10.03 DEO D407-667-245-F-2 DD verf:EC

Component Item ID/ Item Name	Replacement Item ID	Mfg/ Purch	Bin Item	Primary Location	Last Location	Route Seq ID	Unit of Measure	Qty on Hand	Qty per Kit	Total Qty	Qty Issued	Date Issued	Status
D407-667-205TRN		Manufactured	No			110	Each	2.0000	1	1			**

D407-667-205TRN

Crosstube Turning Detail

Location	Loc Qty	Loc Code
LG 77792	2	
75145	1	
76105	1	

i

Rm/TW 12-2-29

AN960JD516

NAS1149D0563J

Purchased

No

230

Each

0.0000

18

18

**

m119717 G

Washer

D2873-043

Manufactured

No

230

Each

34.0000

2

2

**

AB 12-3-13

D2873-043

Nut Plate Assembly

Location	Loc Qty	Loc Code
LG052 79395	34	
72644	2	
73605	12	
75010	20	

2

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Parent Item Name: Crosstube Aft

Start Date: 18/01/2012

Required Date: 08/02/2012

Start Qty: 1.00

Required Qty: 1.00

D2873-045

Manufactured No

230

Each

27.0000

2

2

**

D2873-045

Nut Plate Assembly

79318

Location Loc Qty Loc Code

LG052 80162

27

①

73529

7

②

74985

20

D2894-1

Manufactured No

230

Each

3.0000

1

1

**

D2894-1

2.750 Support

Location Loc Qty Loc Code

LG052

3

74464

3

1

D3190-1

Manufactured No

230

Each

57.0000

2

2

**

D3190-1

Chafing Shield

Location Loc Qty Loc Code

LG053

23

75947

23

LG055

34

72576

34

2

W/O:		WORK ORDER CHANGES					
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D407-667-205

Parent Item Name: Crosstube Aft

Start Date: 18/01/2012

Required Date: 08/02/2012

Start Qty: 1.00

Required Qty: 1.00

D3595-063-450

Manufactured No

230

Each

34.1095

2

2

**

AB 12-3-12

D3595-063-450

RUBBER CUSHION

<u>Location</u>	<u>Loc Qty</u>	<u>Loc Code</u>
MAT052 77078	34.109474	2
67353	2	
68893	6	
70113	0.56	
71354	0.2	
74113	0.349474	
75597	25	

MS20601-AD4W8

Purchased No

230

Each

321.0000

14

14

**

AB 12-3-13

MS20601-AD4W8

RIVET

<u>Location</u>	<u>Loc Qty</u>	<u>Loc Code</u>
LG	100	
108521	100	
LG051 120450	121	14
117106	7	
117381	3	
117979	3	
118572	8	
119107	100	
ST322	100	
118454	100	

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79019
D407-667-205

Parent Item: D407-667-205
Parent Item Name: Crosstube Aft

Start Date: 18/01/2012

Required Date: 08/02/2012
Required Qty: 1.00

MS21920-22 Purchased No 230 Each 76.0000 4 4 ** 18 12-3-12

MS21920-22

Clamp(per MIL-DTL-8783C)

<u>Location</u>	<u>Loc Qty</u>	<u>Loc Code</u>
LG	50	
119545	50	4
LG050	26	
116207	7	
117506	1	
118186	18	

MS21920-25 Purchased No 230 Each 36.0000 2 2 ** 18 12-3-12

MS21920-25

Clamp(per MIL-DTL-8783C)

<u>Location</u>	<u>Loc Qty</u>	<u>Loc Code</u>
LG050	36	
116264	2	
117998	4	
118142	4	
119339	2	
119746	2	
120054	22	2

AN5-10A Purchased No 250 Each 524.0000 10 10 ** 120770 C12/3/1300

AN5-10A

Bolt

<u>Location</u>	<u>Loc Qty</u>	<u>Loc Code</u>
ST337	524	
118191	80	
119547	344	
119981	100	

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

Resolution: _____ Disposition: _____ QA: N/C Closed: _____ Date: _____

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

NOTE: Date & initial all entries

Picklist Print

January-18-12 1:54:15 PM

Page 5

Work Order ID: 79019

79019
D407-667-205

Parent Item: D407-667-205

Parent Item Name: Crosstube Aft

Start Date: 18/01/2012

Required Date: 08/02/2012

Start Qty: 1.00

Required Qty: 1.00

AN5-32A

Purchased No 250 Each 215.0000

4 4

**

120717

Bolt

<u>Location</u>	<u>Loc Qty</u>	<u>Loc Code</u>
ST339	215	
118422	2	
118628	38	
118983	25	
119328	100	
119862	50	

ANS-34A

Purchased No 250 Each 64.0000

4 4

**

117794 2X
119328 2X
4 ✓

MS21042L5

Purchased No 250 Each 1,994.0000

4

**

S *MS210421 5*

117794 2X
119328 2X
4 ✓

Nut

<u>Location</u>	<u>Loc Qty</u>	<u>Loc Code</u>
ST300	1994	
116105	5	
116548	43	
117611	50	
118179	396	
119109	1500	

118179

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

Resolution: _____ Disposition: _____ QA: N/C Closed: _____ Date: _____

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

NOTE: Date & initial all entries

DART AEROSPACE LTD	Work Order:	79019
Description: Crosstube High Aft (407)	Part Number:	D407-667-205
Inspection Dwg: D407-667-245 Rev: F		Page 1 of 1

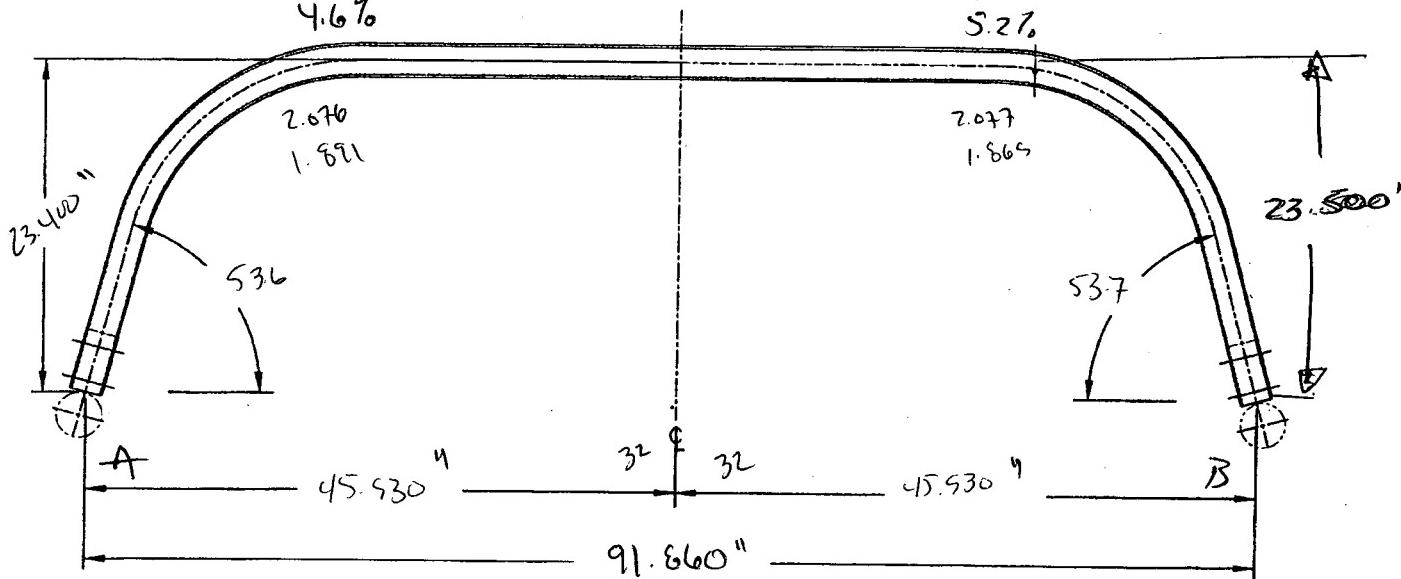
Required Dimension	Min	Max
Height	23.39	23.65
1/2 Span	45.79	46.05
Angle	54	56
Total Span	91.58	92.100

$.185 \div 3.967$

4.670

$.206 \div 3.946$

5.270



Comments
Sine A = 4.670 crushing \odot 32 passes
Sine B = 5.270 crushing \odot 32 passes

QC15 Inspection	<input checked="" type="checkbox"/>
Date	12/02/25

Rev	Date	Change	Revised by	Approved
A	07.02.06	New Issue	KJ/JM	
B	09.06.22	Dwg Rev updated	KJ	
C	11.08.22	Dimensions updated	KJ	
D	11.09.30	Dimensions updated	KJ	<i>[Signature]</i> <i>[Signature]</i>

W/O:		WORK ORDER CHANGES				
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr
						Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____
 Resolution: _____ Disposition: _____ QA: N/C Closed: _____ Date: _____

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

NOTE: Date & initial all entries

8 1 7 1 6 1 5 1 4 1 3 1 2 1

Item	QTY	PART NUMBER	DESCRIPTION
1	X	D407-667-245	CROSSTUBE ASSEMBLY (407 HIGH AFT)
2	1	D6011-115	CROSSTUBE
3	2	D2856-400-773	ABRASION STRIP
4	2	D2873-043	NUT PLATE
5	2	D2873-045	NUT PLATE
6	1	D2894-1	SUPPORT
7	2	D3190-1	CHAFING SHIELD
8	2	D3595-063-430	RUBBER CUSHION
9	14	MS20601AD4W8	RIVET (OR NAS9302B-4-8)
10	4	MS21920-22	CLAMP
11	2	MS21920-25	CLAMP (OR MS21920-24)
12	A/R	MAGNOBOND 6398	ROCKWELL SPECIFICATION RBO-120-023 ADHESIVE (TEXTRON/BELL SPEC. 299-947- 100, TYPE II, CLASS 2 ADHESIVE)

GENERAL NOTES:

- 1) MATERIAL: MANUFACTURED FROM D6011-115
FINISHED LENGTH = 112.91 ± 0.020
- 2) FINISH: CHEMICAL CONVERSION COAT PER DART QSI 005 4.1
PRIME INSIDE AND OUTSIDE PER DART QSI 005 4.2
PAINT OUTSIDE PER DART QSI 005 4.2
- 3) TOLERANCES ARE PER DART QSI 018 UNLESS OTHERWISE NOTED.
- 4) UNITS: INCHES UNLESS OTHERWISE NOTED.
- 5) BREAK SHARP EDGES: 0.005 TO 0.010 MAX.
- 6) IDENTIFICATION: SCRIBE DART PART NUMBER "D407-667-245" AND BATCH NUMBER ON
INSIDE OF CUFF USING VIBRATING STYLS.
- 7) WEIGHT: 27.7 lbs
- 8) PART IS SYMMETRIC ABOUT CENTERLINE.
- 9) RUN-OFF PART. BLEND OUT EDGE LONGITUDINALLY, TRANSITION SHOULD BE SMOOTH.
- 10) BEND PROGRESSIVELY WITH A MINIMUM OF 6 PASSES. MAXIMUM TUBE FLATTENING DUE TO
BENDING IS 6% BASED ON O.D.
- 11) LIQUID PENETRANT INSPECT OUTSIDE SURFACE OF CROSSTUBE PER QSI 038.
- 12) INSTALL D2894-1 CENTER SUPPORT USING A 0.03" TO 0.06" THICK LAYER OF MAGNOBOND
6398 PER QSI 015. LET CURE FOR 12 HOURS AFTER INSTALLATION AND PRIOR TO
PACKAGING.
- 13) INSTALL MS21920-25 CLAMPS WITH D3595-063-430 RUBBER CUSHIONS TO SECURE D2894-1
SUPPORT ON TOP SIDE OF THE CROSSTUBE. ENSURE CLAMPS ARE OPPOSITE CROSSTUBE
SUPPORT.
NOTE: MS21920-24 CLAMPS CAN BE USED TO ACCOMMODATE VARYING DIAMETERS.
ENSURE THERE IS A MINIMUM OF 1.5 THREADS IN SAFETY ON THE NUTS.
- 14) EXTREME CARE MUST BE TAKEN TO PROTECT THE OUTSIDE SURFACE OF THE TUBE. THE
OUTSIDE SURFACE MUST BE SMOOTH AND FREE FROM SURFACE DEFECTS SUCH AS
SCRATCHES, NICKS, OR DENTS. DEFECTS UP TO 0.005" MAY BE BLENDED OUT
LONGITUDINALLY. CIRCUMFERENTIAL GRIND MARKS ARE UNACCEPTABLE.
- 15) INSTALL D2856-400-773 ABRASION STRIP WITH A 0.13 (REF) GAP ON BOTTOM SIDE OF
CROSSTUBE, PER QSI 035.
- 16) INSTALL D3190-1 CHAFING SHIELDS SO THAT OVERLAP IS ON BOTTOM SIDE OF CROSSTUBE
OPPOSITE D2894-1 SUPPORT.
- 17) TORQUE CLAMPS 80 TO 100 IN-LB. ENSURE AT LEAST 1.5 THREADS ARE SHOWING IN
SAFETY AND THAT NUT HAS NOT BOTTOMED-OUT AFTER TORQUING.

EXTRANEOUS
UNCONTROLLED COPY
DO NOT DISTRIBUTE

79019 M.L.J
12/01/18

② DEO ATTACHED

RELEASED
08/11/12 M.L.J

F	REFORMAT NOTES TO NEW STANDARDS (ZN B8-1); RELOCATED FLAG #6 (ZN A8-3) PER NCR 210; REMOVED REF. & ADD TOLERANCES (ZN C6-3, C4-3 & D2-3)	RF	08.11.06
E	8.02 AND 8.53 WERE 8.40 AND 8.90 (ZN D5-2); REORGANIZED VIEWS AND REFORMATTED DRAWING TO CURRENT STANDARDS. REASONS: CLAMPS MOVED 0.375 TOWARD CL TO ELIMINATE INTERFERENCE WITH AIRCRAFT MOUNTS. REFERENCE: PAR#08-21 AND ECN#1225	MB	08.07.24
D	ADD VIEW FOR OEM SKID HOLES, ROTATE ORIENTATION OF CLAMPS SECTION F-F, REMOVE -851 ABRASION STRIP, ADD MAGNOBOND 6398, ADD CUSHION	PH	07.02.07
C	ADD HOLES AND NUT PLATES FOR COMPATIBILITY WITH BHT/A SKIDTUBES	PH	05.07.26
B	ADD CHAFING SHIELD	CP	03.05.21
A	NEW ISSUE	CP	02.05.13
REV.	DESCRIPTION	BY	DATE
DESIGN	99	DART AEROSPACE LTD	
DRAWN	RF	HAWKESBURY, ONTARIO, CANADA	
CHECKED	LP	DRAWING NO.	REV. F
MFG. APPR.	E	D407-667-245	SHEET 1 OF 4
APPROVED	<i>[Signature]</i>	TITLE	SCALE
DE APPR.	<i>[Signature]</i>	CROSSTUBE ASSY (407 HIGH AFT)	NTS
DATE	08.11.06	COPYRIGHT © 2002 BY DART AEROSPACE LTD THIS DOCUMENT IS PRIVATE AND CONFIDENTIAL AND IS SUPPLIED ON THE EXPRESS CONDITION THAT IT IS NOT TO BE USED FOR ANY OTHER PURPOSE THAN THAT FOR WHICH IT WAS PROVIDED WITHOUT WRITTEN PERMISSION FROM DART AEROSPACE LTD	

8 1 7 1 6 1 5 1 4 1 3 1 2 1

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

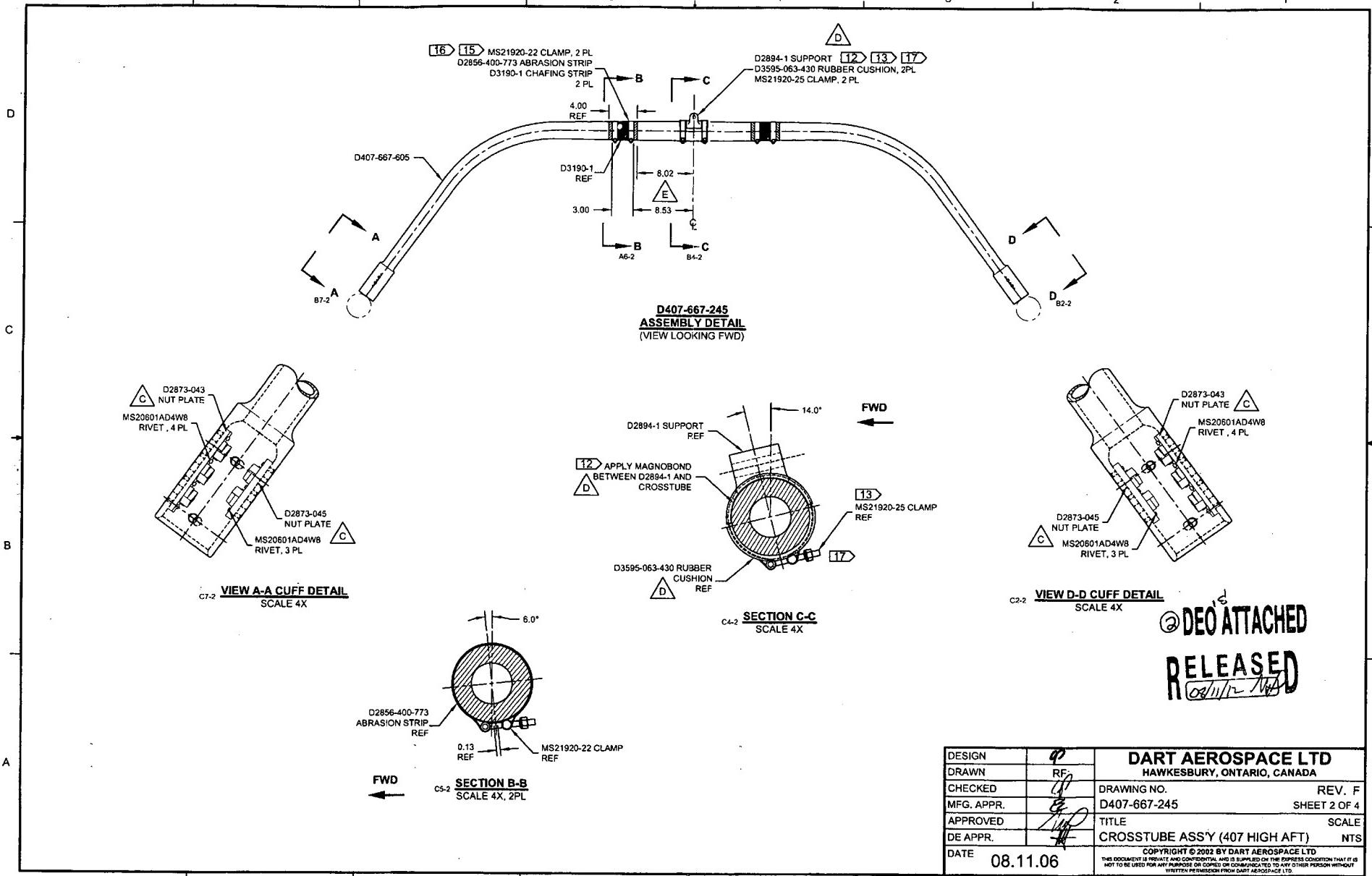
Resolution: _____ Disposition: _____ QA: N/C Closed: _____ Date: _____

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

NOTE: Date & initial all entries

79019

8 7 6 5 4 3 2 1



W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

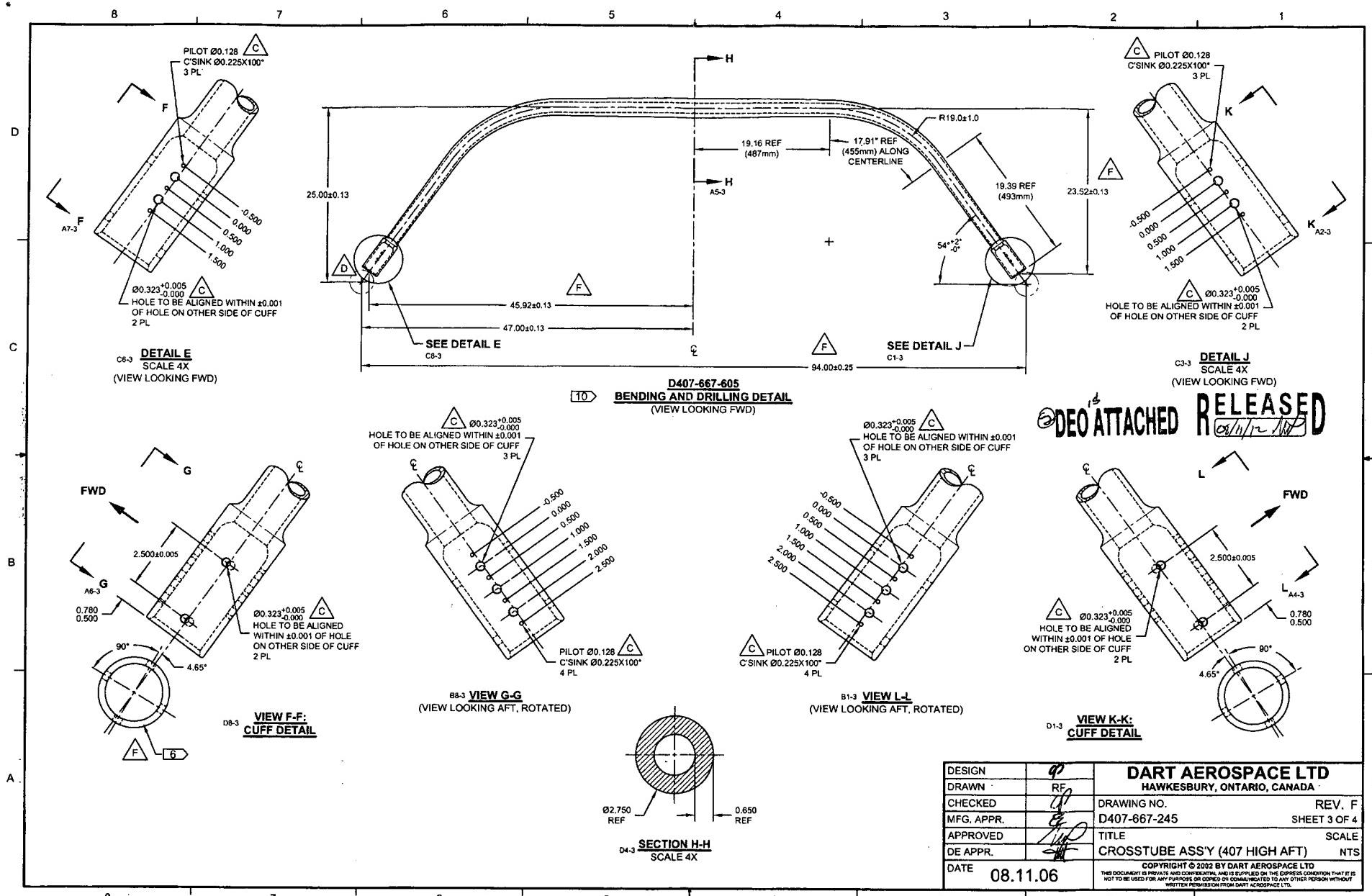
Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

Resolution: _____ Disposition: _____ QA: N/C Closed: _____ Date: _____

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

NOTE: Date & initial all entries

79019



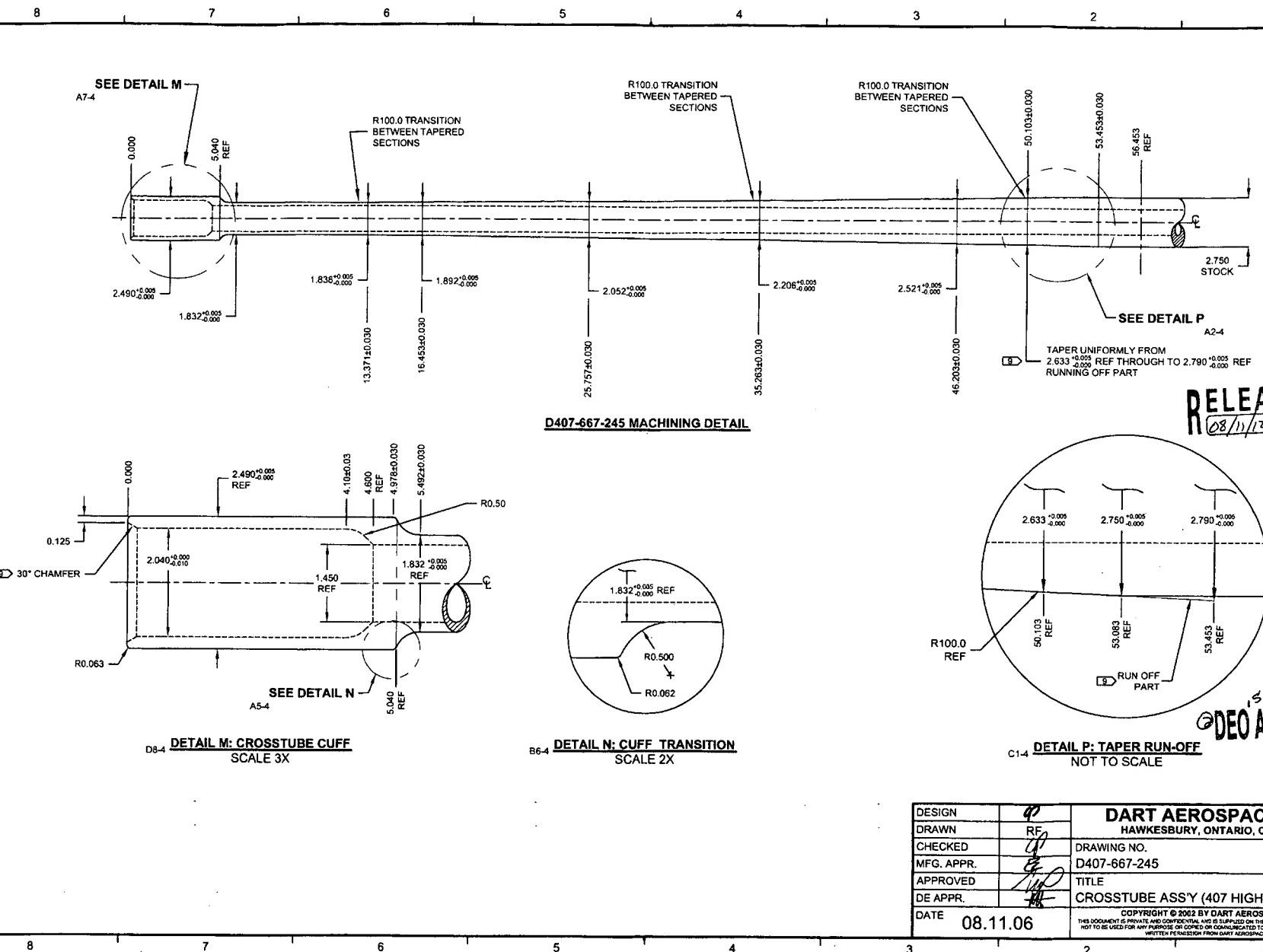
W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____
 Resolution: _____ Disposition: _____ QA: N/C Closed: _____ Date: _____

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

NOTE: Date & initial all entries

79019



W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____
 Resolution: _____ Disposition: _____ QA: N/C Closed: _____ Date: _____

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

NOTE: Date & initial all entries

79019

DRAWING NO. D407-667-245	TITLE CROSSTUBE ASSY (407 HIGH AFT)	REV. F	DART AEROSPACE LTD ENGINEERING ORDER	D.E.O. NO. D407-667-245-F-1	SHEET NO. SHEET 1 OF 2	SCALE NTS
DRAWN <i>b</i>	CHECKED <i>q</i>	MFG. APPR. <i>8</i>	APPROVED <i>MD</i>	DE APPR. <i>MM</i>	DATE 11.04.12	DATE 11.04.12
DATE 11.04.08	DATE 11.04.12	DATE 11.04.12	DATE 11.04.12	DATE 11.04.12	DATE 11.04.12	DATE 11.04.12

PURPOSE:

REMOVED ABRASION STRIP IN FAVOR OF A THIN LAYER OF PROSEAL 890.

CHANGE:

PARTS LIST IS AMENDED AS FOLLOWS:

IS:

Item	Qty	Part Number	Description
	-245		
3	0	D2856-400-773	ABRASION STRIP

WAS:

3	2	D2856-400-773	ABRASION STRIP
---	---	---------------	----------------

NOTES 2 AND 15, SHEET 1 ARE AMENDED AS FOLLOWS:

IS:

- 2) FINISH: CHEMICAL CONVERSION COAT PER DART QSI 005 4.1
 PRIME INSIDE AND OUTSIDE PER DART QSI 005 4.2
 MASK UNDERSIDE OF CROSSTUBE AS SHOWN (HATCHED AREA) AND
 PAINT OUTSIDE PER DART QSI 005 4.2
 REMOVE MASKING AND APPLY CLEAR COAT
- 15) APPLY A THIN COAT OF PROSEAL 890 ON INSIDE CONCAVE SURFACE OF D3190-1
 CHAFING SHIELDS AND LET CURE PER MANUFACTURER'S INSTRUCTIONS. INSTALL
 PROSEALED D3190-1 CHAFING SHIELDS ONTO CROSSTUBE BY APPLYING A THIN COAT
 OF PROSEAL 890 ONTO CROSSTUBE. BE SURE TO ELIMINATE ANY AIR GAPS.

WAS:

- 2) FINISH: CHEMICAL CONVERSION COAT PER DART QSI 005 4.1
 PRIME INSIDE AND OUTSIDE PER DART QSI 005 4.2
 PAINT OUTSIDE PER DART QSI 005 4.2
- 15) INSTALL D2856-400-773 ABRASION STRIP WITH A 0.13 REF GAP ON BOTTOM SIDE OF
 CROSSTUBE PER QSI 035.

RELEASED
2011-04-18
[Signature]

W/O:		WORK ORDER CHANGES				
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

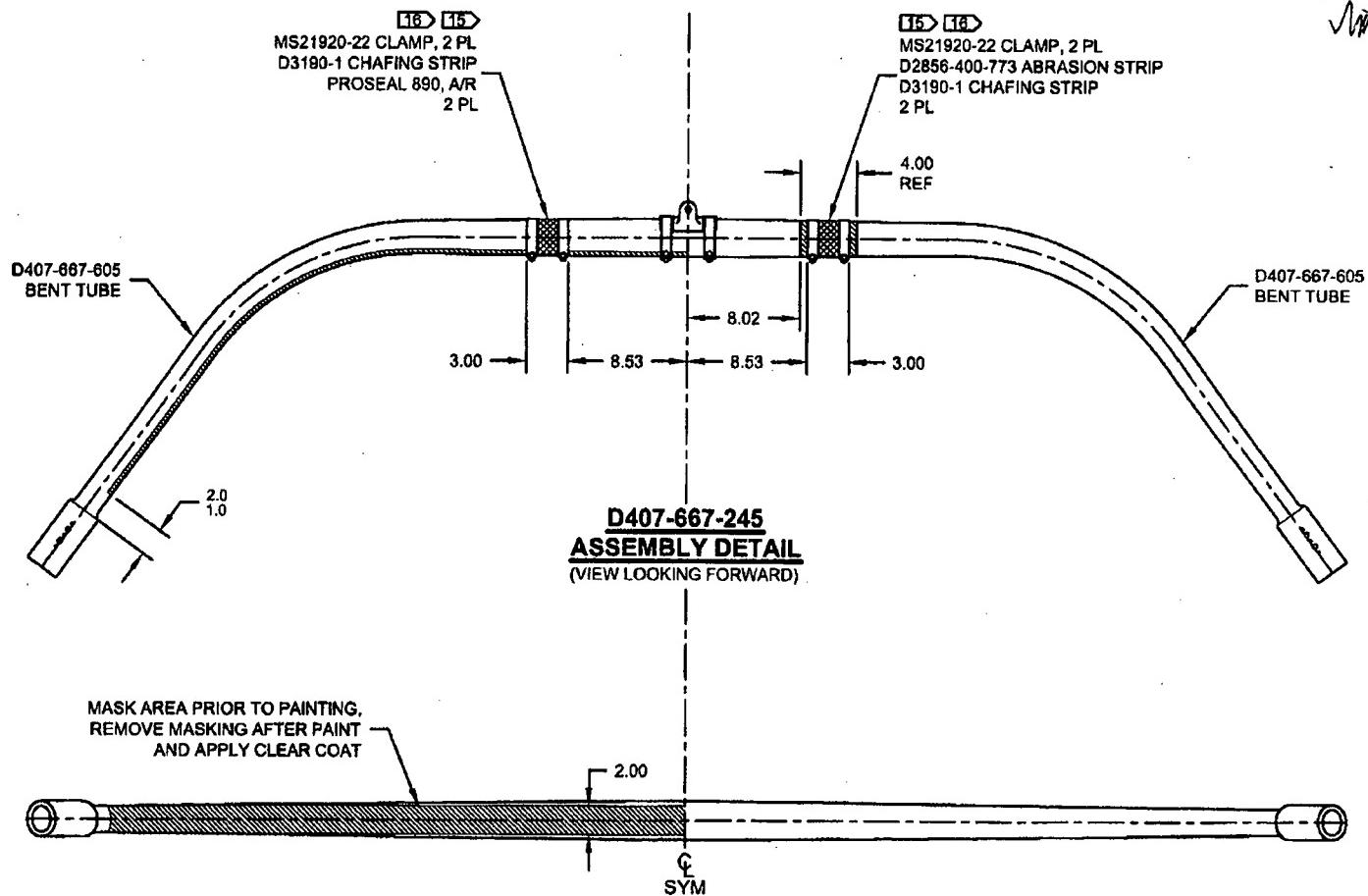
Resolution: _____ Disposition: _____ QA: N/C Closed: _____ Date: _____

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

NOTE: Date & initial all entries

79019

DRAWING NO. D407-667-245	TITLE CROSSTUBE ASSY (407 HIGH AFT)	REV. F	DART AEROSPACE LTD ENGINEERING ORDER	D.E.O. NO. D407-667-245-F-1	SHEET NO. SHEET 2 OF 2	SCALE NTS
DRAWN DATE 11.04.08	CHECKED DATE 11.04.11	MFG. APPR. DATE 11.04.12	APPROVED DATE 11/04/12	DE APPR. DATE 11.04.12		

IS:WAS:RELEASED
2011-04-18

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

Resolution: _____ Disposition: _____ QA: N/C Closed: _____ Date: _____

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

NOTE: Date & initial all entries

J9019

DRAWING NO. D407-667-245	TITLE CROSSTUBE ASS'Y (407 HIGH AFT)	REV. F	DART AEROSPACE LTD ENGINEERING ORDER	D.E.O. NO. D407-667-245-F-2	SHEET NO. SHEET 1 OF 1	SCALE NTS
DRAWN <i>90</i>	CHECKED <i>ASS</i>	MFG. APPR. <i>ES</i>	APPROVED <i>MD</i>	DE APPR. <i>#</i>		
DATE 11.09.07	DATE 11.09.10	DATE 11.09.19	DATE 11.09.19	DATE 11.09.19	DATE 11.09.19	

PURPOSE:

REPLACE MAGNOBOND WITH 3M DP460 SCOTCH-WELD EPOXY ADHESIVE

CHANGE:

IS:

Item	Qty 245	Part Number	Description
12	A/R	SCOTCH-WELD DP460	EPOXY ADHESIVE, 3M SCOTCH-WELD

WAS:

12	A/R	MAGNOBOND 6398	ROCKWELL SPECIFICATION RBO-120-023 ADHESIVE (TEXTRON/BELL SPEC. 299-947-100, TYPE II, CLASS 2 ADHESIVE)
----	-----	----------------	---

NOTE 12 & 17, SHEET 1 IS AMENDED AS FOLLOWS:

IS:

- 12) INSTALL D2894-1 CENTER SUPPORT USING A 0.04" TO 0.07" THICK LAYER OF SCOTCH-WELD DP460 PER QSI 015. LET CURE FOR 24 HOURS AFTER INSTALLATION AND PRIOR TO PACKAGING.
- 15) TORQUE CLAMPS 80 TO 100 IN-LB. ENSURE AT LEAST 1.5 THREADS SHOWING IN SAFETY AND THAT NUT HAS NOT BOTTOMED-OUT AFTER TORQUING. PRIOR TO PACKAGING, RE-CHECK TORQUE ON CLAMPS AFTER ADHESIVE HAS CURED FOR 24 HOURS.

WAS:

- 12) INSTALL D2894-1 CENTER SUPPORT USING A 0.03" TO 0.06" THICK LAYER OF MAGNOBOND 6398 PER QSI 015. LET CURE FOR 12 HOURS AFTER INSTALLATION AND PRIOR TO PACKAGING.
- 15) TORQUE CLAMPS 80 TO 100 IN-LB. ENSURE AT LEAST 1.5 THREADS ARE SHOWING IN SAFETY AND THAT NUT HAS NOT BOTTOMED-OUT AFTER TORQUING.

RELEASED
2011-09-29
MD

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____
 Resolution: _____ Disposition: _____ QA: N/C Closed: _____ Date: _____

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

NOTE: Date & initial all entries



LIQUID PENETRANT TEST REPORT

P- 14909

IENT
ENTION
DRESS
JECT
EM(S) EXAMINED

Dart AeroSlice
LINDA L.
1270 ABERDEEN
HAWKES BAY ON.
F.P.I. on cross tubes

DATE 03/02/2002 TIME AM PAGE 1 OF 1

ACUREN JOB NO. 180-12-00058 PM

PO/WO NO. -

WORK LOCATION SSME

ACCEPTANCE STD ASTM 1417/04-038 REV./DATE 2005

TEST DESCRIPTION	PROCEDURE NO. <u>LT 1002</u>	REV./DATE <u>2008</u>	TECHNIQUE NO. <u>LT/FH2</u>	REV./DATE <u>2008</u>
ART NO.	<u>SEE RESULTS</u>			
SCOPE	<u>A WET FLUORESCENT LIQUID PENETRANT EXAMINATION</u> <u>on 100% of EXTERNAL SURFACE</u>			

TEST DETAILS				
METHOD	<input checked="" type="checkbox"/> FLUORESCENT	<input type="checkbox"/> VISIBLE	<input checked="" type="checkbox"/> WATER WASH	<input type="checkbox"/> SOLVENT REMOVABLE
BRAND	<u>HAGA Flux</u>			
ENTRANT	<u>Z667</u>	MINIMUM Dwell TIME	<u>45</u> MIN.	<input type="checkbox"/> POST EMULSIFIED
ENTRANT REMOVER	<u>1120</u>	MINIMUM DRY TIME	<u>>10</u> MIN.	<input type="checkbox"/> BLACK LIGHT S/N <u>16459</u>
DEVELOPER	<u>SAD 52</u>	MINIMUM Dwell TIME	<u>10</u> MIN.	<input type="checkbox"/> OUTPUT > 1000 μ W/cm ²
DEVELOPER TYPE	<input checked="" type="checkbox"/> NON AQUEOUS	<input type="checkbox"/> AQUEOUS	<input type="checkbox"/> DRY	<input type="checkbox"/> AMBIENT < 2 fc
LIGHTING EQUIP.	<u>LABINDO</u>			
OTHER	<u>109866</u>			
CAL DUE DATE	<u>07/27</u>			

TEST SURFACE				
INTERFACE CONDITION	<input type="checkbox"/> AS GROUND	<input type="checkbox"/> AS WELDED	<input type="checkbox"/> MACHINED	<input type="checkbox"/> SHOT BLASTED
INTERFACE TEMPERATURE	<input type="checkbox"/> < -4°C/20°F	<input type="checkbox"/> -4°C/20°F to 10°C/50°F	<input type="checkbox"/> 10°C/50°F to 52°C/125°F	<input checked="" type="checkbox"/> CLEAN BARE METAL
RESULTS-	<input type="checkbox"/> METRIC <input type="checkbox"/> IMPERIAL			

<u>Cross tubes</u>			
1	- W.O.	73924	X
1	- W.O.	76252	✓
1	- W.O.	75662	✓
1	- W.O.	75664	✓
1	- W.O.	79934	✓
1	- W.O.	79933	✓
1	- W.O.	79019	✓
1	- W.O.	79018	✓
1	- W.O.	76254	✓
		<u>REScanned 1 Time</u>	
<u>517103105</u>			

Scope of Services:
The agreement of Acuren Group Inc. to perform services extends only to those services provided for in writing. Under no circumstances shall such services extend beyond the performance of the requested services. It is expressly understood that all descriptions, comments and expressions of opinion reflect the opinions or observations of Acuren Group Inc., based on information and assumptions supplied by the owner/operator and are not legal if nor can they be construed as representations or warranties. Acuren Group Inc. is not assuming any responsibilities of the owner/operator and the owner/operator retains complete responsibility for the engineering, manufacture, repair and use decisions as a result of the data or other information provided by Acuren Group Inc. In no event shall Acuren Group Inc.'s liability in respect of the services referred to herein exceed the amount paid for such services.

Standard of Care:
In performing the services provided, Acuren Group Inc. uses the degree, care and skill ordinarily exercised under similar circumstances by others performing such services in the same or similar locality. No other warranty, expressed or implied, is made or intended by Acuren Group Inc.

SIGNATURES

CLIENT REPRESENTATIVE	<u>Andrea Sheldon</u> PRINT	<u>R. Sheldon</u> SIGNATURE	DTR # <u>E68914</u>
TECHNICIAN (SIGNATURE):	<u>J. KEITH STONE</u>		
JAME (PRINT):	<u>J. KEITH STONE</u>	1 ST TECHNICIAN	REPORT
CGSB LEVEL	<u>S</u>	SNT LEVEL <u>S</u>	REVIEWED BY:
CGSB REG. NO.	<u>66606</u>		NAME <u> </u> INITIALS <u> </u>
CGSB LEVEL	<u>S</u>	SNT LEVEL <u>S</u>	
CGSB REG. NO.	<u>66606</u>		

WHITE - CLIENT COPY

CANARY - OFFICE COPY

PINK - TECHNICIAN COPY

GOLD - OFFICE COPY

5.0 PARTS LIST

5.1 HIGH GEAR CROSSTUBES

Item	Qty -101	Qty -201	Qty -103	Qty -203	Qty -105	Qty -205	Part Number	Description
	X						D206-667-101	CROSSTUBE INSTALLATION, 206A/B HIGH FWD
		X					D206-667-201	CROSSTUBE INSTALLATION, 206A/B HIGH AFT
			X				D206-667-103	CROSSTUBE INSTALLATION, 206L/L-1/L-3/L-4 HIGH FWD
				X			D206-667-203	CROSSTUBE INSTALLATION, 206L/L-1/L-3/L-4 HIGH AFT
					X		D407-667-105	CROSSTUBE INSTALLATION, 407 HIGH FWD
						X	D407-667-205	CROSSTUBE INSTALLATION, 407 HIGH AFT
1	1						D206-667-141	CROSSTUBE ASSEMBLY, 206A/B HIGH FWD
2		1					D206-667-241	CROSSTUBE ASSEMBLY, 206A/B HIGH AFT
3			1				D206-667-143	CROSSTUBE ASSEMBLY, 206L/L-1/L-3/L-4 HIGH FWD
4				1			D206-667-243	CROSSTUBE ASSEMBLY, 206L/L-1/L-3/L-4 HIGH AFT
5					1		D407-667-145	CROSSTUBE ASSEMBLY, 407 HIGH FWD
6						1	D407-667-245	CROSSTUBE ASSEMBLY, 407 HIGH AFT
10	*2	*2	*2		*2		D2891-1	SUPPORT
11				*2			D2892-1	SUPPORT
12						*1	D2894-1	SUPPORT
13	*4	*4	*4		*4		D3595-063-395	RUBBER CUSHION
14				*4			D3595-063-450	RUBBER CUSHION
15						*2	D3595-075-430	RUBBER CUSHION
16	*4	*4	*4		*4		MS21920-20	CLAMP
17				*4			MS21920-22	CLAMP
18						*2	MS21920-25	CLAMP (OR MS21920-24)
19	4	4	4		4		AN5-32A	BOLT
20				4		4	AN5-34A	BOLT
21	4	4	4	4	4	4	MS21042L5	NUT (OR MS21042-5)
22	8	8	8	8	8	8	NAS1149C0563J	WASHER (OR AN960JD516)
23						*2	D3190-1	CHAFING SHIELD
40	*2		*2	*2	*2	*2	D2873-043	NUT PLATE
41	*2		*2	*2	*2	*2	D2873-045	NUT PLATE
42		2					D2872-043	NUT PLATE
43		2					D2872-045	NUT PLATE
44	10		10				AN5-7A	BOLT
45		10		10	10	10	AN5-10A	BOLT
46	4	10	4		4		AN5-30A	BOLT
47				4		4	AN5-32A	BOLT
48			12				AN970-4	WASHER (OPTIONAL)
49		6					MS21042L5	NUT (OR MS21042-5)
50	10	12	10	10	10	10	NAS1149C0563J	WASHER (OR AN960JD516)
60		1					D3039-3	CENTER DRILL (TOOLING, NOT INSTALLED)

*REFERENCE ONLY. PARTS ARE INCLUDED IN D206-667-141/-143/-241/-243 & D407-667-145/-245 ASSEMBLIES ABOVE

Change Record

Part Number D407-667-205
Description 407 AFT CROSS TUBE

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